

3.13 Vectors in the Plane

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Let \mathbf{u} be the vector represented by the directed line segment \overrightarrow{RS} and \mathbf{v} be the vector represented by the directed line segment \overrightarrow{OP} . Determine if \mathbf{u} and \mathbf{v} are equal.

1) $R = (-4, 7)$, $S = (-1, 5)$, $O = (0, 0)$, and $P = (3, -2)$ 1) _____

2) $R = (2, 1)$, $S = (0, -1)$, $O = (1, 4)$, and $P = (-1, 2)$ 2) _____

Find the component form and magnitude of the indicated vector.

3) Given that $P = (2, 3)$ and $Q = (4, 12)$, find the component form and magnitude of the vector \overrightarrow{PQ} . 3) _____

4) Given that $P = (11, 6)$ and $Q = (3, 7)$, find the component form and magnitude of the vector \overrightarrow{QP} . 4) _____

5) Given that $P = (-2, 7)$ and $Q = (-4, -2)$, find the component form and magnitude of the vector $3\overrightarrow{PQ}$. 5) _____

6) Given that $P = (5, 4)$, $Q = (7, 3)$, $R = (8, 6)$, and $S = (4, 1)$, find the component form and magnitude of the vector $\overrightarrow{PQ} + 3\overrightarrow{RS}$. 6) _____

Find the component form of the indicated vector.

7) Let $\mathbf{u} = \langle -7, -2 \rangle$, $\mathbf{v} = \langle -5, -8 \rangle$. Find $\mathbf{u} + \mathbf{v}$. 7) _____

8) Let $\mathbf{u} = \langle -2, 9 \rangle$, $\mathbf{v} = \langle 7, 1 \rangle$. Find $\mathbf{u} - \mathbf{v}$. 8) _____

9) Let $\mathbf{u} = \langle -4, 1 \rangle$, $\mathbf{v} = \langle 5, -3 \rangle$. Find $-3\mathbf{u} + 2\mathbf{v}$. 9) _____

10) Let $u = \langle 8, -4 \rangle$, $v = \langle -1, 2 \rangle$. Find $2u - v$.

10) _____

Find the unit vector in the direction of the given vector. Write your answer in the indicated form.

11) Let $u = \langle 1, 3 \rangle$. Find the unit vector in the direction of u , and write your answer in component form.

11) _____

12) Let $u = -3i + 5j$. Find the unit vector in the direction of u , and write your answer in component form.

12) _____

13) Let $u = \langle 1, 3 \rangle$. Find the unit vector in the direction of u , and write your answer as a linear combination of the standard unit vectors i and j .

13) _____

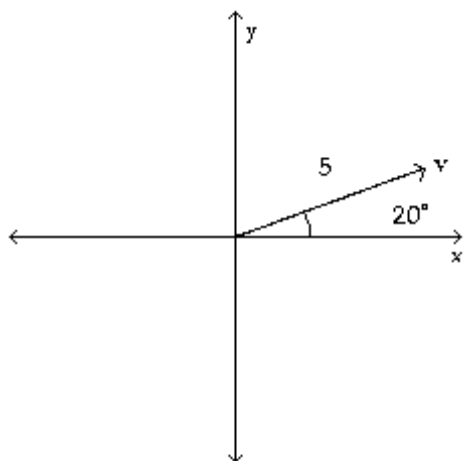
14) Let $u = \langle -5, -1 \rangle$. Find the unit vector in the direction of u , and write your answer as a linear combination of the standard unit vectors i and j .

14) _____

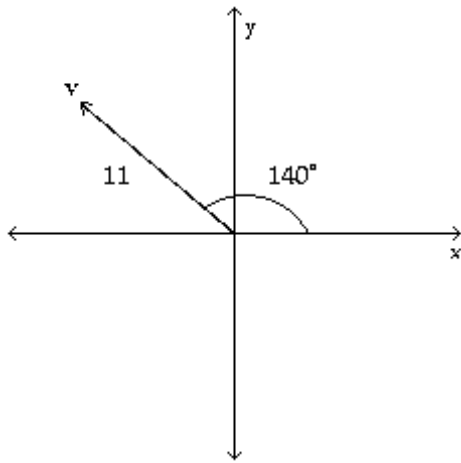
Find the component form of the vector v .

15)

15) _____



16)



16) _____

Find the magnitude and direction angle for the following vector. Give the direction angle as an angle in $[0^\circ, 360^\circ)$ rounded to the nearest tenth.

17) $\langle 1, 10 \rangle$

17) _____

18) $-5i + 3$

18) _____

19) $5(\cos 144^\circ i + \sin 144^\circ j)$

19) _____

Solve the problem.

- 20) A plane is heading due south with an airspeed of 211 mph. A wind from a direction of 53.0° is blowing at 17.0 mph. Find the bearing of the plane. (Note that bearings are measured from north, clockwise.) Round results to an appropriate number of significant digits.

20) _____

- 21) An airplane flies on a compass heading of 90.0° at 220 mph. The wind affecting the plane is blowing from 321° at 48.0 mph. What is the true course and ground speed of the airplane? Round results to an appropriate number of significant digits.

21) _____